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Some New North American Psyllidae (Homoptera).

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(Plate V.)

The writer has been working on a critical review of North American Psyllidae for the past two years. Some of the new forms encountered are described in this paper. The material is from the U. S. National Museum, the University of Kansas, and the author's collection. The writer would like to obtain as much North American material as is available and will gladly determine material in this group for the privilege of studying it.

Arytaina hirsuta n. sp.

Similar to *A. pubescens* in size and pubescence but reddish in color, wings reddish brown, genitalia quite distinct. Length to tip of folded wings, 2.00-2.25 mm.

Color: General body color, including legs, red. Head and thoracic dorsum with prominent white pubescence. Disc of vertex white, except medial line and two foveae black; antennae black at tip. Thoracic dorsum white, heavily marked with black and red; scutum definitely striped. Forewings reddish fumate, darker toward apex. Veins red.

Structure: Head deflexed, slightly broader than thorax. Discal foveae and medial suture of vertex very prominent. Postero-lateral portions of vertex, which bear ocelli, prominently raised. Genal cones quite sharp, pubescent. Antennae about one and one-half times as long as width of head. Thorax heavily pubescent, granular. Forewings twice as long as broad, coriaceous; pterostigma short and broad.

Genitalia: Male proctiger longer than forceps, narrow in lateral view; forceps longer than in *pubescens*, strongly curved inward, tapering to apices which bear small black hooks, the postero-medial margin with very heavy golden pubescence. Female genital segment short, constricted midway and very narrow to apex; dorsal valve slightly longer than ventral.

Holotype, male, *allotype,* female, two male and fourteen female paratypes, Lapine, Oregon, July 2, 1935, P. W. Oman; other paratypes as follows: one male, Klamath, Ore., July 1, 1935, one female, Bend, Ore., July 2, 1935, P. W. Oman; one female, Lapine, Ore., July 2, 1935 and one female, Reno, Nevada, June 26, 1935, R. H. Beamer.

Holotype, allotype and paratypes in U. S. National Museum. Paratypes in Snow Collection, University of Kansas, and author's collection.

Psylla nana n. sp.

(Plate V, Fig. 1.)

Resembling *Psylla minuta* but the forewings definitely maculate, the vertex and thoracic dorsum not pubescent and the genal cones much smaller. Length to tip of folded wings, 2.00-2.25 mm.

Color: General body color, including legs, dirty white, with orange markings. Vertex white with margins, median line and discal foveae orange; genal cones white; antennal segments dark on apices, last two segments black. Thoracic dorsum with a median orange line, a pair of broader orange stripes on each side of scutum. Forewings more or less fumate in basal half; membrane whitish with somewhat irregular brown maculae as illustrated; veins white.

Structure: Head of median size, vertex bulging forward between antennae, with medial suture and discal foveae prominent. Genal cones small, short, blunt, somewhat pubescent. Antennae about twice as long as width of head. Thorax relatively flat. Forewings two and one-third times as long as broad, broadly rounded; pterostigma very short.

Genitalia: Male genitalia quite large. Proctiger slightly longer than forceps, tapering from rather broad base, apex bent posteriorly at right angles. Forceps fairly broad in lateral view, curved forward and then posteriorly near apices, apices black. Female genital segment shorter than rest of abdomen, dorsal valve straight on dorsal side; ventral valve evenly curved up to apex, slightly exceeded by dorsal valve.

Holotype, male, *allotype,* female, and one male paratype, Santa Rita Mts., Arizona, July 17, 1932, R. H. Beamer; two male and four female paratypes, Patagonia, Ariz., June 24, 1933, P. W. Oman.

Holotype, allotype and paratype in Snow Entomological Collection, University of Kansas; paratypes in U. S. National Museum and author's collection.

Trioza shepherdiae n. sp.

(Plate V, Fig. 2.)

This typically triozine species does not resemble very closely any of the known North American members of this genus. Length to tip of folded wings, 2.50 mm.

Color: General color of head, thoracic dorsum and legs light testaceous to fulvous. Vertex light except discal foveae; genal cones, eyes, distal half of antennae dark. Prescutum with a pair of brown stripes halfway back. Scutum with two inverted V-shaped, brown marks. Wing membranes slightly fumate; veins brown. Abdomen brown to black.

Structure: Head and thoracic dorsum coarsely granular. Head of medium size, narrower than thorax. Vertex decidedly emarginate in front, with very prominent discal foveae, postero-lateral angles, which bear ocelli, raised. Genal cones short, about one-half as long as vertex, conical, almost parallel to plane of vertex. Antennae about one and one-half times as long as width of head. Pronotum depressed. Prescutum strongly arched. Forewings two and one-half times as long as wide, membrane rather thick, slightly rugose, venation typical. Hind wings more rugose than forewings. Legs of medium length, hind tibiae with one spine outside, two inside.

Genitalia: Male genital segment small. Proctiger as long as forceps, almost right-triangular in lateral view, posterior lobe of medium length. Forceps slender, irregularly narrowed to sharp apices, with medium pubescence. Female genital segment short, dorsal valve decidedly longer than ventral, terminating in a heavy, black, up-curved hook, usually exceeded by partially extended ovipositor sheath.

Holotype, female, *allotype*, male, 45 female and 9 male paratypes, Lake City, Colorado, June 29, 1937, L. D. Tuthill; 20 female and 5 male paratypes were collected by R. H. Beamer at the same time. Holotype, allotype and paratypes in author's collection, paratypes in Snow Entomological Collection, University of Kansas, and U. S. National Museum.

This species was taken on *Shepherdia canadensis* (L.) Nutt. growing in a dense stand beneath aspen.

Trioza chlora n. sp.

(Plate V, Fig. 3.)

In Crawford's key this species runs to *albifrons*. It is, however, quite unlike the latter species. The genal cones are less acute, less divergent and are directed downward; the wings are very slender and acute at apex. Length to tip of folded wings, 3.25-3.50 mm.

Color: General color white to yellow except eyes and apical two-thirds of antennae black. Thoracic dorsum and vertex deeper yellow to orange. Wings hyaline.

Structure: Head medium in size, post-ocular occipital region very large giving the eyes the appearance of projecting forward. Vertex evenly excavated, rather deeply emarginate in front, extending forward over front ocellus. Genal cones vertical, about as long as vertex, rather acute. Antennae twice as long as width of head. Thorax strongly arched. Forewings almost three times as long as broad, sharply angled. Venation typical triozine.

Genitalia: Male genitalia small. Proctiger broad at base, tapered to slightly produced apex, bearing a black spine at base on either side. Forceps slightly shorter than proctiger, broad in lateral view, anterior margin almost straight, posterior margin slightly curved, apex roundly truncate and slightly produced anteriorly; apical margin brown. Female genital segment shorter than rest of abdomen, basal portion subglobular, apex a short, brown styliform elongation; dorsal valve slightly longer than ventral.

Holotype, male, Pearce, Arizona, Aug. 23, 1935, R. H. Beamer; *allotype*, female, Huachuca Mts., Ariz., Aug. 22, 1935, R. H. Beamer. Types in Snow Entomological Collection, University of Kansas.

Rhinopsylla schwarzi Riley

This species which has been known heretofore only from two males is represented in the Snow Collection by two females. They are similar to the males except that the fore femora are not enlarged, this apparently being a secondary sexual character.

The female genital segment is short, the dorsal valve narrowly hood-shaped, overhanging the ventral valve, the latter scarcely produced, slit at apex.

Allotype, female, Ponce de Leon, Florida, July 13, 1934, R. H. Beamer, and *parallotype,* same data, in the Snow Entomological Collection, University of Kansas.

LEVIDEA n. gen.

Head small, much narrower than thorax, deflexed; vertex smooth, perpendicular, slightly rounded, median suture lacking or at least not apparent except just above front ocellus; genae somewhat swollen below antennae, almost touching; clypeus large and globose, visible from front; antennae moderate in length, longer than width of head. Thorax moderately arched; episternum of pronotum produced laterally around posterior of eye. Wings triozine in venation and shape, pointed at apex, somewhat thickened and maculate. Legs rather short, apex of hind tibia with two spines inside, one outside.

Genotype, Levidea lineata, n. sp.

Levidea lineata n. sp.

(Plate V, Figs. 4, 4a, 4b, 4c, 4d.)

Length to tip of folded wings, 3.00-3.50 mm.

Color: General body color, including legs, stramineous. Vertex and genae light, antennae darker. Eyes dark. Two brown lines extending across prescutum, sometimes incomplete, continuing on scutum as a diverging pair of lines. Membrane of forewings with small brown spots, very thick at anal margin to sparse on costal margin, the veins unspotted except at marginal cells, thus giving general appearance of stripes.

Structure: Head very small, strongly deflexed; vertex slightly swollen in appearance, perfectly smooth except for two very small foveae near the occipital margin and remnant of medial suture above front ocellus. Genae slightly swollen. Clypeus very large, visible from front or side. Antennae twice as long as width of head. Thorax moderately arched, the episternum of the pronotum developed out and around the occiput. Forewings slightly more than twice as long as wide, without pterostigma or cubital petiole, marginal cells about equal.

Genitalia: Male genitalia large, proctiger triangular in outline, broad at base, slightly longer than forceps which are simple, tapering from base to acute apices, quite strongly arched, apices touching, pubescent on posterior margins. Female genital segment large with rather dense, silky pubescence; dorsal valve very large, hood-shaped, ventral valve smaller, sharply pointed.

Holotype, female, *allotype,* male, 9 female and 4 male paratypes, Mustang Mt., Arizona, June 12 and 20, 1933, P. W. Oman; 3 female and 1 male paratypes, Mustang Mt., Ariz., June 12, 1933, R. H. Beamer. Holotype, allotype and paratypes in U. S. National Museum. Paratypes in Snow Entomological Collection, University of Kansas and in author's collection.

Mr. Oman says that this unique species apparently lives upon "wild rubber," *Parthenium incanum.*

Explanation of Plate V.

Fig. 1. *Psylla nana,* forewing.
Fig. 2. *Trioza shepherdiae,* ♀ genitalia.
Fig. 3. *Trioza chlora,* ♀ genitalia.
Fig. 4. *Levidea lineata,* front view of head.
Fig. 4a. *Levidea lineata,* lateral view of head.
Fig. 4b. *Levidea lineata,* forewing.
Fig. 4c. *Levidea lineata,* ♀ genitalia.
Fig. 4d. *Levidea lineata,* ♂ genitalia.

A Bibliography of Keys for the Identification of Immature Insects. Part I. Diptera*.

By Wm. P. Hayes, University of Illinois.

Nowhere in entomological literature are bibliographies available to assist in locating works containing keys or tables for the identification of immature insects. The work of Banks listing the keys for adult insects has been of great value to persons looking for keys to adults and it should be brought up to date. We have no such work treating the immature stages. A few institutions throughout the United States are now offering some work in the taxonomy of immature insects. Having been engaged in teaching such a course for twelve years, the writer has accumulated a rather comprehensive bibliography of papers which contain such keys. Mimeographed copies listing the available works in the various orders have been of much use to students and requests for copies from workers throughout the country are frequently received. It is hoped to supplement this work in the near future with bibli-

* Contribution No. 195 from the entomological laboratories of the University of Illinois.